DEPARTMENT OF THE ARMY
OFFICE OF THE SURGEON GENERAL
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FALLS CHURCH, VA 22041-3258

REPLY TO
ATTENTION OF

DASG-PPM-NC

2 9 JUN 2004

MEMORANDUM FOR Deputy Assistant Secretary of the Army-Environment, Safety and Occupational Health, ATTN: DASA-ESOH (Mr. James Dries), 110 Army Pentagon, Washington, DC 20310-0110

SUBJECT: Nerve Agent Percutaneous Exposure Criteria and Airborne Exposure Levels (AELs) for GD/GF for Use in Interim DA Guidance on Implementation of the New AELs

1. Enclosed is the Office of The Surgeon General recommended interim criteria for nerve agent percutaneous exposure and airborne exposure levels for GD and GF.

2. Point of contact for this action is LTC Lisa Black at (703) 681-0650. Technical point of contact is Dr. Coleen Weese, U. S. Army Center for Health Promotion and Preventive Medicine, at (410) 436-2714.

FOR THE SURGEON GENERAL:

JOSEPH G. WEBB, JR.
Major General
Deputy Surgeon General

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Recommended Nerve Agent Percutaneous Exposure Criteria and Airborne Expsoure Levels (AELs) for GD/GF for Use in Interim DA Guidance on Implementation of the New AELs

1. References.

a. Oak Ridge National Laboratory, Evaluation of Chemical Warfare Agent Percutaneous Vapor Toxicity: Derivation of Toxicity Guidelines for Assessing Chemical Protective Ensembles, July 2003. Annetta Watson, Dennis Opresko, and Veronique Hauschild. ORNL/TM-2003/180.

b. Edgewood Research Development and Engineering Center, Evaluation of Airborne Exposure Limits for G-Agents: Occupational and General Population Exposure Criteria. ERDEC-TR-489.

c. Federal Register (FR) Volume 68, Number 196, 17 September 2003. Final Recommendations for Protecting Human Health from Potential Adverse Effects of Exposure to Agents GA (Tabun), GB (Sarin) and VX.

2. Background. The Centers for Disease Control and Prevention (CDC) published Final Recommendations for Airborne Exposure Limits (AELs) for Nerve Agents in the Federal Register on 17 September 2003 (68 FR 54460). The Assistant Secretary of the Army for Installations and Environment [ASA(I&E)] has drafted Interim Guidance for Implementation of the New Airborne Exposure Limits. This interim guidance was drafted during a series of meetings attended by key Army participants and stakeholders in the demilitarization process. The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) and the Office of The Surgeon General (OTSG) were represented at these meetings to provide input regarding medical issues, response, and worker safety. During this meeting, USACHPPM/OTSG was tasked to provide concentrations for use in the determination of when medical evaluation would be required following percutaneous vapor exposure if mask only protective ensemble was used. It was also requested that recommended AELs for agents GD and GF be provided. Exposure levels to agent GD and GF are established through relative potency to GB, and the potency ratios have been previously evaluated and documented. However, the CDC did not recommend AELs for GD and GF since their recommendations addressed demilitarization only and GD and GF are not part of the stockpile. These agents may be an issue for non-stockpile and research activities. This letter provides percutaneous exposure criteria and AEL values for GD and GF.

3. Nerve Agent Percutaneous Exposure Concentrations.

a. The interim guidance identifies conditions of exposure which require medical evaluation. This guidance implements medical evaluation when near real time monitoring indicates an exposure to an unprotected worker at the Short Term Exposure Limit (STEL), and administrative action and correction when historical monitoring

indicates an exposure above the eight-hour Worker Population Limit (WPL). This is in accordance with the CDC intent. However, it was recognized that in some instances, dermal exposure would be the route of concern if workers have respiratory protection but a rip in a suit occurred, or if a worker was in a mask only protective ensemble. The concentrations of concern for skin-only exposure to vapor are higher than those for vapor exposure to a worker without respiratory protection, where the eyes and respiratory tract would be the exposures of concern. The Chemical Materials Agency indicated that identifying percutaneous vapor thresholds would be helpful for use in determining the need for medical evaluation in the scenario where percutaneous exposure is the route of concern.

b. A July 2003 report from Oak Ridge National Laboratories identified such values for use in assessing chemical protective ensembles. This document identifies upper and lower end estimated minimal effect Cts (concentration X time, or dose) for percutaneous vapor toxicity. This document indicates that the effective Ct remains constant for periods of exposure of 30 minutes to 2 hours. Utilizing the lower end estimates and defining time as a 30-minute exposure yields a concentration which can be used to serve as a guide for exposures requiring medical evaluation. Thirty minutes was selected as a reasonable time period due to policies and procedures which indicate that thirty minutes is sufficient to allow egress and allow for several cycles of near real time monitoring data. The percutaneous vapor concentrations are thus identified as follows:

GA: 11.1 mg/m^3
GB: 6.0 mg/m^3
GD/GF: 1.5 mg/m^3
VX: 0.13 mg/m^3
HD: 0.1 mg/m^3

4. Airborne Exposure Limits (AEL) for Nerve Agents GD and GF.

a. The final recommendations for nerve agent AELs did not include values for GD and GF. Although AELS recommended by CHPPM were submitted to the CDC, the CDC has responsibility to provide oversight to the chemical demilitarization program and noted that these agents are not part of the U.S. stockpile. These agents may be encountered as part of non-stockpile operations or research, thus AELs for these agents are necessary to protect worker and general public safety and health.

b. The USACHPPM recommendations for all nerve agent AELs (to include GD and GF) were submitted through the OTSG to the CDC. The CDC made some modifications utilizing professional judgment and based on comments received. All of the nerve agents AELs derived and endorsed by the CDC utilize the concept of the relative potency of the G-agent to GB (Sarin) since the experimental data for GB is the most extensive and the G-agents share the same mechanism of action. All G-agents are identified as more or less potent as the standard, GB. GA and GB are considered equipotent, whereas GD and GF are considered to be twice as potent as GB. However,

the CDC did not modify or endorse any AELs for GD/GF since it was not considered under their purview. The relative potency concept and the USACHPPM-recommended AELs had been reviewed in the technical report submitted to the CDC and presented at all of the working and public meetings. Given a CDC-recommended value for GB, it is possible to apply the relative potency concept to GD and GF. For two values, the revised AELs differ only by a factor of three which is considered to be within the area of acceptable uncertainty. These values were left unchanged. As such, the AELs recommended for use for these agents is as follows:

Recommended AEL concentrations in mg/m3 for Agents GD and GF based on GB*

Agent	STEL	WPL**	IDLH	GPL***
GB	0.0001	0.00003	0.1	0.000001
GD	0.00005	0.00003	0.05	0.000001
GF	0.00005	0.00003	0.05	0.000001

*Final CDC GB Recommendations.
** Existing value
***Existing value

5. These values are provided as requested for utilization in the upcoming Interim Guidance for Implementation of the New AELs to be released from OASA(I&E).